



SEQUENCE LISTING

<110> .. Ausubel, Frederick M.
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Mylonakis, Eleftherios
Sifri, Costi D.

<120> Enterococcal Virulence Factors

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<140> US 10/758,979

<141> 2004-01-16

<150> PCT/US02/22979

<151> 2002-07-18

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Gln	Glu	Ala	His
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<212> PRT

<213> Enterococcus faecalis

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Ser Glu Ile Gly Ser Met Asp Ser Ile Phe Thr Gln Asp Glu Ala Ser
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Lys Asp Gln Leu Ile Pro Ala Ala Ala Lys Glu Met Pro Glu Ile Ser
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Glu Asp Gly Lys Arg Tyr Thr Ile Lys Leu Arg Glu Asp Gly Lys Trp
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Ser Asn Gly Asp Ala Val Thr Ala Asn Asp Phe Val Phe Ala Trp Arg
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Lys Leu Ala Asn Pro Lys Asn Gln Ala Asn Tyr Phe Phe Leu Leu Glu
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Gly Thr Ile Leu Asn Gly Thr Ala Ile Thr Lys Glu Glu Lys Ala Pro
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Pro Asp Tyr Glu Ala Ile Glu Arg Ser Lys Val Tyr Ser Leu Arg Leu		
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<212> PRT
<213> Enterococcus faecalis

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Glu Ala Ile Glu Asn Gly Asp Ala Gln Glu Leu Ser Lys Lys Met Arg		
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Thr Asn Glu Ser Glu Phe Gln Val Asn Pro Gln Ser Ile Lys Pro Leu		
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Ile Thr Tyr Tyr Gln Lys Asn Pro Thr Glu Leu Lys Lys Leu Glu Lys		
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Ala Leu Leu Lys Asp Lys Lys Leu His Gly Leu Thr Ile Arg Glu Thr		
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Arg Lys Val Gly Thr Leu Thr Asn Gly Ser Lys Thr Ile Gly Pro Leu		
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Ser Asp Tyr Asp Ala Arg Lys Ala Leu Glu Thr Phe Tyr Gln Ala Phe
 305 310 315 320

Ala Lys Gln Val Lys Ser His Thr Asp Ser Thr Glu Phe Ala Lys Lys
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Tyr Leu Val Gly Gly Glu Asn Asn Pro Gln Phe Pro Ser Phe Ile Glu
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Ala Leu Glu Arg Leu Arg Glu Lys Lys Ser Thr Asp Gly Ser Pro Asp
 355 360 365

Phe Glu Val Thr Ile Asn Thr Leu Gln Leu Asp Gly Lys Glu Asn Tyr
 370 375 380

His Val Asn Tyr Tyr Leu Glu Ala Lys Asn Ser Lys Ala Lys Glu Asn
 385 390 395 400

Gly Leu Arg Tyr Glu Trp Ile Asn Gly Leu Asn Asp Gln Ile His Leu
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<210> 14
 <211> 1473
 <212> DNA
 <213> *Enterococcus faecalis*

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<210> 15
 <211> 490
 <212> PRT
 <213> Enterococcus faecalis

<400> 15

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Ala Gln Ser Ser Trp Arg Phe Lys Tyr His Ile Gln Pro Gln Thr Gly
 35 40 45

Leu Leu Asn Asp Pro Asn Gly Phe Ser Tyr Phe Asn Asn Gln Trp His
 50 55 60

Leu Phe Tyr Gln Ala Phe Pro Phe Gly Ser Val His Gly Leu Lys Ser
 65 70 75 80

Trp Ala His Leu Thr Ser Ser Asp Leu Ile His Trp Asp Tyr Glu Gly
 85 90 95

Ile Ala Leu Tyr Pro Asp Ser Glu Tyr Asp Ser His Gly Val Tyr Ser
 100 105 110

Gly Ser Ala Leu Thr Ile Asp Asn Gln Leu Cys Leu Phe Tyr Thr Gly
 115 120 125

Asn Val Arg Asp Gln Thr Trp Gln Arg Phe Ala Tyr Gln Asn Ile Ala
 130 135 140

Trp Leu Asn Ser Leu Gly Ala Ile Thr Lys Glu Ser Thr Pro Phe Leu
 145 150 155 160

Pro Ile Asp Pro Asn Tyr Ser Ser His Phe Arg Asp Pro Met Val Phe
 165 170 175

Pro Tyr Gln Glu Gly Leu Val Leu Leu Ile Gly Ala Ser Asp Leu Asn
 180 185 190

Gly Gln Gly Lys Ile Val Val Tyr Phe Ser Lys Asp Arg Asn Val His
 195 200 205

Asn Phe His Gln Leu Gly Glu Leu Thr Phe Thr Asn Gln Glu Leu Gly
210 215 220

Tyr Met Val Glu Cys Pro Asn Leu Val Phe Ile Asp Gly Gln Pro Val
225 230 235 240

Leu Leu Phe Cys Pro Gln Gly Leu Ser Pro Ser Val Lys Ser Tyr Gln
245 250 255

Asn Ile Tyr Pro Asn Met Tyr Thr Leu Ala Glu Thr Phe Asp Leu Glu
260 265 270

Asn Leu Ser Leu Val Gln Ala Gly Pro Phe Glu Asn Leu Asp Glu Gly
275 280 285

Phe Asp Val Tyr Ala Thr Gln Ala Phe Asn Ala Pro Asp Gly Arg Ala
290 295 300

Leu Ala Val Ser Trp Ile Gly Leu Pro Glu Ile Thr Tyr Pro Ser Asp
305 310 315 320

Val Glu Gly Trp Ala Asn Gly Leu Ser Leu Val Lys Glu Leu Thr Ile
325 330 335

His Asn Gly Lys Leu Phe Gln Tyr Pro Val Ser Glu Thr Glu Met Leu
340 345 350

Arg Gln Ser Ala Thr Thr Leu Ser Asn Gly Cys His Phe Leu Ser Thr
355 360 365

Ala Ser Phe Glu Leu Glu Val Asp Ile Pro Lys Asn Glu Ile Ala Phe
370 375 380

Ile Arg Leu Leu Ala Asn Glu Thr Gly Ser Lys Gly Leu Leu Ile Thr
385 390 395 400

Ile Asp Thr Ile His Gly Lys Ile Thr Leu Asp Arg Thr Phe Ala Gly
405 410 415

Gln Ser Phe Ala Glu Lys Tyr Gly Thr Ile Arg Glu Thr Lys Ile Arg
420 425 430

Lys Asn Lys Ser Val Gln Leu Thr Ile Phe Val Asp Cys Ser Val Ala
 435 440 445

Glu Ile Tyr Val Asn Lys Gly Glu Lys Thr Met Thr Gly Arg Phe Phe
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Pro Asp Lys Ala Gln Gln Tyr Leu His Leu Ser Lys Thr Ala Lys Ala
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<210> 16
 <211> 2089
 <212> DNA
 <213> Enterococcus faecalis

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<210> 17
 <211> 1347
 <212> DNA
 <213> Enterococcus faecalis

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<210> 18
<211> 448
<212> PRT
<213> Enterococcus faecalis

<400> 18

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20 25 30

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35 40 45

Gly Ile Lys Gly Ala Val Ala Leu Asn Ser Thr Leu Gln Tyr Ser Glu
50 55 60

Lys Arg Tyr Ile Leu Ala Lys Met Phe Gln Tyr Asp Tyr Leu Phe Leu

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Trp	Gly	Val	Asp	Phe	Arg	Pro	Glu	Tyr	Ser	Lys	Leu	Asp	Leu	Val	Gln
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Lys	Gln	Leu	Asp	Phe	Pro	Leu	Thr	Leu	Ala	Leu	Thr	Ala	Thr	Ala	Thr
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Tyr	Gln	Glu	Val	Leu	Ser	Ser	Val	Asn	Arg	Lys	Asn	Ile	Gly	Leu	Phe
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Val	Lys	Glu	Thr	Ser	Glu	Lys	Glu	Glu	Val	Leu	Leu	Asp	Tyr	Leu	Ser
			180					185						190	
Lys	Thr	Ala	Gly	Lys	Ile	Ile	Ile	Tyr	Cys	Ala	Thr	Arg	Asn	Lys	Thr
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		210					215					220			
Tyr	Tyr	His	Gly	Gly	Leu	Glu	Ala	Ser	Glu	Arg	Ser	Arg	Leu	Gln	Glu
225					230					235					240
Gln	Phe	Ile	Asp	Asn	Gln	Ile	Asp	Ile	Leu	Cys	Ala	Thr	Asn	Ala	Phe
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Gly	Met	Gly	Ile	Asp	Lys	Pro	Asp	Val	Arg	Gly	Val	Ile	His	Phe	Asp
			260					265						270	
Leu	Pro	Asp	Ser	Leu	Glu	Asn	Tyr	Leu	Gln	Glu	Ile	Gly	Arg	Ala	Gly
		275					280					285			
Arg	Asp	Gly	Gln	Lys	Ser	Trp	Ala	Leu	Leu	Leu	Tyr	Lys	Lys	Gly	Asp
	290						295				300				

Glu Phe Ile His Arg Phe Phe Leu Glu Glu Thr Arg Ala Asn Arg Ala
 305 310 315 320

Thr Leu Lys Ser Leu Ile Glu Gly Glu Glu Gln Ala Gly Leu Leu Glu
 325 330 335

Asn Ala Thr Glu Leu Gln Gln Lys Trp Val Gln Gly Tyr Leu Ala Lys
 340 345 350

Asp Tyr Ser Phe Glu Glu Leu Glu His Arg Leu Glu Glu Lys Glu Lys
 355 360 365

Asp Arg Gln Ala Gln Leu Arg Gly Met Leu Thr Tyr Ile Glu Thr Thr
 370 375 380

Thr Cys Arg Arg Thr Leu Ile Gln Thr Tyr Phe Gln Glu Pro Ile Val
 385 390 395 400

Lys Gln Ser Pro Glu Thr Cys Cys Asp Asn Cys Ala Leu Phe Phe Asp
 405 410 415

Ile Tyr Gln Asp Ser Ile Val Lys Ser Asn Lys Thr Ser Asn Gln Asn
 420 425 430

Glu Glu Gly Trp Arg Ser Lys Phe Leu Lys Leu Phe Lys Glu Arg Asp
 435 440 445

<210> 19
 <211> 2096
 <212> DNA
 <213> Enterococcus faecalis

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<210> 20
 <211> 888
 <212> DNA
 <213> Enterococcus faecalis

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<210> 21
 <211> 294
 <212> PRT
 <213> Enterococcus faecalis

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 Ser Lys Gln Ile Lys Ile Leu Glu Ala Thr Leu Gly Ala Glu Leu Phe
 35 40 45

Asn Arg Gln Gly Gln Thr Thr Thr Leu Thr Pro Ala Gly Leu Ile Leu
50 55 60

Glu Lys Tyr Cys Trp Arg Ile Thr Asn Glu Leu Val Ser Ile Glu Glu
65 70 75 80

Glu Leu Lys Glu Ile Asn His Ser Ser Asn His Ile Tyr Val Ala Thr
85 90 95

Tyr Leu Cys Asp Leu Glu Tyr Lys Leu Asn Asp Leu Leu Met Thr Thr
100 105 110

Leu Thr Asp Arg Ser Ser Asn Leu Gln Val His Thr Ile Ile Thr Glu
115 120 125

Asn Ile Leu Gln Ser Leu Glu Thr Met Asp Ala Asp Phe Gly Ile Ser
130 135 140

Phe Ala Asp Leu Pro Leu Pro Glu His Ile Gly Lys Ile Asp Leu Phe
145 150 155 160

Thr Ala Asn Tyr Gln Phe Ile Leu Arg Asn Asp His Pro Ala Leu Ala
165 170 175

Lys Ala Thr Thr Glu Glu Ile Leu Lys Glu Leu Thr Met Tyr Pro Phe
180 185 190

Val Arg Leu Asn Thr Glu Phe Ser Glu Gln Asn Lys Leu Thr Asn Trp
195 200 205

Leu Asp Thr Thr Phe Ser Asn Phe Ser Pro Glu Lys Val Ile Gln Val
210 215 220

Asp Thr Leu Ser Leu Ile Thr His Leu Val Ser His Ser Asp Phe Ala
225 230 235 240

Ile Val Pro Glu Tyr Thr Asn Ile Gln Leu Leu Asp Asn Ser Ile His
245 250 255

Thr Leu Thr Tyr Gln Glu Leu Pro Lys Arg Asn Met Ala Val Tyr Tyr
260 265 270

Leu Lys Glu Arg Tyr Met Ser Arg Gln Leu Gln Gln Leu Leu Ala Glu

275

280

285

Cys Gln Lys Gln Phe Gln
290

<210> 22

<211> 2340

<212> DNA

<213> Enterococcus faecalis

<400> 22

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 <213> Enterococcus faecalis

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<211> 432
<212> PRT
<213> Enterococcus faecalis

<400> 24

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35 40 45

Leu Lys Leu Ala Glu Arg Tyr Gly Phe Gln Thr Gly Ile Val Asn Asp
50 55 60

Ala Val Gly Tyr Ala Gln Trp Gly Thr Ala Glu Glu Tyr Leu Gly Ile
65 70 75 80

Ile Gly His Leu Asp Val Val Pro Glu Gly Ser Gly Trp Ser Val Pro

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275					280					285						
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325 330 335

Ser Glu Val Thr Val Ile Arg Arg Leu Pro Ser Thr Leu Phe Pro Lys
340 345 350

Asp Glu Arg Asn Val Gln Lys Leu Thr Lys Val Tyr Glu Gln Ile Thr
355 360 365

Gly Leu Asp Gly Thr Pro Val Thr Thr Thr Gly Ala Thr Tyr Ala Arg
370 375 380

Phe Met Pro Asn Ile Val Ala Phe Gly Pro Ser Phe Pro Gly Gln Lys
385 390 395 400

Gly Ile Ala His Asn Gln Asp Glu Tyr Met Asp Glu Lys Asp Leu Leu
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420 425 430

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<211> 2362
<212> DNA
<213> Enterococcus faecalis

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2362

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<212> DNA
<213> Enterococcus faecalis

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<211> 282
<212> PRT
<213> Enterococcus faecalis

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20 25 30
Asp Gly Lys Ile Tyr Asn Glu Gly Ile Asp Ile Glu Ala Asp Glu Tyr
35 40 45

Tyr Ala Leu Leu Asn Asn Ser Lys Glu Phe Pro Thr Thr Ser Gln Pro
50 55 60

Ala Leu Gly Glu Val Leu Glu Leu Tyr Lys Ser Ile Ala Glu Gln Gly
65 70 75 80

Tyr Asp Thr Ile Ile Ser Ile His Leu Ser Ser Gly Ile Ser Gly Phe
85 90 95

Val His Thr Leu His Gly Leu Thr Asp Glu Ile Pro Gly Val Ala Leu
100 105 110

Tyr Pro Tyr Asp Ser Lys Ile Thr Ser Met Pro Met Gly His Met Val
115 120 125

Glu Ala Ala Leu Asp Leu Thr Glu Glu Lys Ala Ser Leu Glu Glu Ile
130 135 140

Phe Ala Lys Leu Asp Leu Ile Arg Asp Asn Thr Tyr Ala Tyr Leu Ile
145 150 155 160

Val Glu Asp Leu Asn Asn Leu Val Arg Gly Gly Arg Leu Thr Asn Gly
165 170 175

Ala Ala Leu Ile Ala Gly Leu Leu Lys Ile Lys Pro Ile Leu Thr Phe
180 185 190

Glu Asp Gly Lys Ile Val Leu Phe Glu Lys Ile Arg Ser Thr Lys Lys
195 200 205

Ala Phe Ala Arg Ala Glu Lys Ile Ile Gly Glu Arg Asn Ala Gly Ile
210 215 220

Glu Ala Pro Val Lys Leu Tyr Val Ile His Ala Asn Asn Arg Ile Val
225 230 235 240

Ala Glu Lys Glu Gln Ala Lys Leu Gln Lys Leu Tyr Pro Asn Ala Glu
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Ile Glu Ile Gly His Phe Gly Pro Val Ile Gly Thr His Leu Gly Glu
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<210> 28
 <211> 2203
 <212> DNA
 <213> Enterococcus faecalis

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tgtggccgct ttaaagggtt tcgacaaata agtcgggggc acatatagca tttcagctaa	2040
ctgttccaaa gtaatttctt cgtcatgggtg cgtttccaga taataaatcg tatgattgac	2100
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<210> 29
 <211> 528
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 <213> Enterococcus faecalis

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tatttctttg ctttttataa taatgaactt gcaggttatg tgaaattaaa tcacggtgat	240
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<210> 30
 <211> 175
 <212> PRT

<213> Enterococcus faecalis

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Asn Glu Lys Asp Leu Gln Ala His Tyr Glu Arg Lys Phe Ser Pro Ala
35 40 45

Val Leu Glu Ser Glu Ile Leu His Lys Asp Ser Gln Tyr Phe Phe Ala
50 55 60

Phe Tyr Asn Asn Glu Leu Ala Gly Tyr Val Lys Leu Asn His Gly Asp
65 70 75 80

Ala Gln Ile Thr Tyr Gln His Pro Gln Ala Leu Gln Val Glu Arg Ile
85 90 95

Tyr Ile Arg Lys Ser Phe Lys Arg Leu Gly Leu Gly Lys His Leu Ile
100 105 110

Thr Lys Ala Ile Glu Leu Ala Glu Glu Ala Glu Lys Glu Thr Val Trp
115 120 125

Leu Gly Val Trp Glu His Asn His Pro Ala Gln Lys Phe Tyr Gln Ser
130 135 140

Leu Gly Phe Val Lys Thr Asp Glu His Asp Phe Tyr Met Gly Asn Glu
145 150 155 160

Arg His Thr Asp Tyr Thr Met Thr Lys Gln Leu Lys Glu Ser Thr
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<210> 31

<211> 8347

<212> DNA

<213> Enterococcus faecalis

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 1 5
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 Gly Ala Thr Arg Leu Ala Gly Leu Phe Ala Lys Pro Ser Gln His Ser
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 Ile Ser Pro Leu Ile His Asn Thr Ala Phe Gln Asn Leu Gly Val Asp
 25 30 35
 gct cgg tat ctg gcg ttt gac gtt gga caa gag aca ttg cca caa gca 320
 Ala Arg Tyr Leu Ala Phe Asp Val Gly Gln Glu Thr Leu Pro Gln Ala
 40 45 50
 att gaa gcg att cga acg ttt cac atg tta ggg gcc aac tta tca atg 368
 Ile Glu Ala Ile Arg Thr Phe His Met Leu Gly Ala Asn Leu Ser Met
 55 60 65
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 Pro Asn Lys Val Ala Ala Val Ser Tyr Met Asp Glu Leu Ser Pro Thr
 70 75 80 85

gct caa ctg gtt ggc gca att aat acg att gtc aac aaa gat gga aaa	464
Ala Gln Leu Val Gly Ala Ile Asn Thr Ile Val Asn Lys Asp Gly Lys	
90 95 100	
ctt tac gga gac agc acg gat ggt act ggt ttt atg tgg agt ttg aaa	512
Leu Tyr Gly Asp Ser Thr Asp Gly Thr Gly Phe Met Trp Ser Leu Lys	
105 110 115	
gag aaa aag gtt gac gtt ttt cag aat aaa atg acc atc tta gga aca	560
Glu Lys Lys Val Asp Val Phe Gln Asn Lys Met Thr Ile Leu Gly Thr	
120 125 130	
ggt ggt gca gcc tta tca atc att gcc caa gct gct tta gat ggc gtg	608
Gly Gly Ala Ala Leu Ser Ile Ile Ala Gln Ala Ala Leu Asp Gly Val	
135 140 145	
aaa gaa atc gcc gtt tac aac agg aaa agc gcg ggc ttt aac gac agt	656
Lys Glu Ile Ala Val Tyr Asn Arg Lys Ser Ala Gly Phe Asn Asp Ser	
150 155 160 165	
caa aaa aaa ctg gca aat ttc act gaa cga acc aac tgt gta att cat	704
Gln Lys Lys Leu Ala Asn Phe Thr Glu Arg Thr Asn Cys Val Ile His	
170 175 180	
tta aac gat tta gcg gat act gaa aaa cta gca aaa gat gtt gct gaa	752
Leu Asn Asp Leu Ala Asp Thr Glu Lys Leu Ala Lys Asp Val Ala Glu	
185 190 195	
agc gtc ttg tta gtt aat gca acg agt gtg ggt atg cat cca cat gcg	800
Ser Val Leu Leu Val Asn Ala Thr Ser Val Gly Met His Pro His Ala	
200 205 210	
cat agt agt cct ata gaa aat tat gca atg att caa ccg aag tta ttt	848
His Ser Ser Pro Ile Glu Asn Tyr Ala Met Ile Gln Pro Lys Leu Phe	
215 220 225	
gtg tat gat gct att tat aat ccc aga gaa aca cag tta tta aaa gaa	896
Val Tyr Asp Ala Ile Tyr Asn Pro Arg Glu Thr Gln Leu Leu Lys Glu	
230 235 240 245	
gcc cgt tta cgt ggt gca gaa aca agc aac ggc ttg gac atg cta ctt	944
Ala Arg Leu Arg Gly Ala Glu Thr Ser Asn Gly Leu Asp Met Leu Leu	
250 255 260	
tat caa ggc gct gct gct ttt gaa caa tgg aca gga caa aaa atg cct	992
Tyr Gln Gly Ala Ala Ala Phe Glu Gln Trp Thr Gly Gln Lys Met Pro	
265 270 275	
gta tca gtc gta aaa cgt aaa att gaa aat aga taa aaagagcgcc	1038
Val Ser Val Val Lys Arg Lys Ile Glu Asn Arg	
280 285	
gttttaaaggc atgaggagag aatata atg atc gta att atg aaa gaa aat gca	1091
Met Ile Val Ile Met Lys Glu Asn Ala	
290 295	

acc gaa aag caa atg aaa caa gtc att gat tta gta aca ggt gca ggc Thr Glu Lys Gln Met Lys Gln Val Ile Asp Leu Val Thr Gly Ala Gly 300 305 310	1139
tta act act caa aca agt caa gat aat gga aaa aca gtg ata ggc ttg Leu Thr Thr Gln Thr Ser Gln Asp Asn Gly Lys Thr Val Ile Gly Leu 315 320 325	1187
att ggt gat aca gaa aaa tta gtt gaa gca gag tta aca gca tta gaa Ile Gly Asp Thr Glu Lys Leu Val Glu Ala Glu Leu Thr Ala Leu Glu 330 335 340 345	1235
ggc gtg gag aaa agt gtc cgc att tcg ttg tct tac aaa cta acg agt Gly Val Glu Lys Ser Val Arg Ile Ser Leu Ser Tyr Lys Leu Thr Ser 350 355 360	1283
cgt tta ttt cat cca gag aat aca gtg gtt gat gtg aac ggt gtt aaa Arg Leu Phe His Pro Glu Asn Thr Val Val Asp Val Asn Gly Val Lys 365 370 375	1331
atc ggt gac ggc agt atg acc atg atg gcg ggc cct tgt tca atc gaa Ile Gly Asp Gly Ser Met Thr Met Met Ala Gly Pro Cys Ser Ile Glu 380 385 390	1379
agc tta gat cag att cgc gaa tgt gcg cga att gct aaa gct gga ggt Ser Leu Asp Gln Ile Arg Glu Cys Ala Arg Ile Ala Lys Ala Gly Gly 395 400 405	1427
gca aca att tta cga ggt ggt gca ttc aaa cct aga acg tcg cca tac Ala Thr Ile Leu Arg Gly Gly Ala Phe Lys Pro Arg Thr Ser Pro Tyr 410 415 420 425	1475
gct ttc caa gga cta gaa gaa gaa gga cta aaa tac att cgc caa gcg Ala Phe Gln Gly Leu Glu Glu Glu Gly Leu Lys Tyr Ile Arg Gln Ala 430 435 440	1523
gct gat gaa tta gat atg caa gtc att aca gaa gtg atg gat gaa gcg Ala Asp Glu Leu Asp Met Gln Val Ile Thr Glu Val Met Asp Glu Ala 445 450 455	1571
aat tta gaa ctt gtc gca aaa tac agt gac att tta caa atc ggt gcg Asn Leu Glu Leu Val Ala Lys Tyr Ser Asp Ile Leu Gln Ile Gly Ala 460 465 470	1619
cgc aac atg caa aat ttc aag tta tta caa gcg gtt ggt aaa act gga Arg Asn Met Gln Asn Phe Lys Leu Leu Gln Ala Val Gly Lys Thr Gly 475 480 485	1667
aaa cct att ggc tta aaa cgc ggg att gct ggt acg att gat gaa tgg Lys Pro Ile Gly Leu Lys Arg Gly Ile Ala Gly Thr Ile Asp Glu Trp 490 495 500 505	1715
cta aac gca gct gaa tac att gct gcg caa gga aat ttc aat gtg atc Leu Asn Ala Ala Glu Tyr Ile Ala Ala Gln Gly Asn Phe Asn Val Ile 510 515 520	1763
ttc att gaa cgt ggg att cgt acg tac gaa acc gct acg cgc aat aca	1811

Phe Ile Glu Arg Gly Ile Arg Thr Tyr Glu Thr Ala Thr Arg Asn Thr	
525 530 535	
ctt gat tta agt gcg gtg cct tta att aaa aaa tta agt cat ttt cca	1859
Leu Asp Leu Ser Ala Val Pro Leu Ile Lys Lys Leu Ser His Phe Pro	
540 545 550	
att att gtt gat ccg agt cat ggt gtt ggt atc tgg gat tta gta ccg	1907
Ile Ile Val Asp Pro Ser His Gly Val Gly Ile Trp Asp Leu Val Pro	
555 560 565	
cca atg gcc cga gca ggt gtt gct tca ggt gcg gac ggc ttg att gta	1955
Pro Met Ala Arg Ala Gly Val Ala Ser Gly Ala Asp Gly Leu Ile Val	
570 575 580 585	
gaa att cat cca gat cca gcg aat gcg tgg tca gat ggg cca caa tcc	2003
Glu Ile His Pro Asp Pro Ala Asn Ala Trp Ser Asp Gly Pro Gln Ser	
590 595 600	
ttg aat gaa aaa act tac cta cgt atg atg aaa gaa gtt cat atc atc	2051
Leu Asn Glu Lys Thr Tyr Leu Arg Met Met Lys Glu Val His Ile Ile	
605 610 615	
gaa aaa gca atg aaa gaa att aat gct tta gaa gat tag taaagacaga	2100
Glu Lys Ala Met Lys Glu Ile Asn Ala Leu Glu Asp	
620 625	
ggagtagagg ac atg aaa tta acc gta acg tta cct aca cat tca tat gat	2151
Met Lys Leu Thr Val Thr Leu Pro Thr His Ser Tyr Asp	
630 635 640	
tta acc atc gaa aca ggt gcc tta gat aaa att ggc acc tgg gta cgt	2199
Leu Thr Ile Glu Thr Gly Ala Leu Asp Lys Ile Gly Thr Trp Val Arg	
645 650 655	
agc ctg tgg cag cca caa cgg gta gcg att att acc gat gaa acg gtg	2247
Ser Leu Trp Gln Pro Gln Arg Val Ala Ile Ile Thr Asp Glu Thr Val	
660 665 670	
aat aaa tta tat ggc gca gct gtt gag aaa gaa ttg caa gct gct ggt	2295
Asn Lys Leu Tyr Gly Ala Ala Val Glu Lys Glu Leu Gln Ala Ala Gly	
675 680 685 690	
ttt gaa aca tca ttg att gct gta gcg gca ggt gaa caa agt aag agc	2343
Phe Glu Thr Ser Leu Ile Ala Val Ala Ala Gly Glu Gln Ser Lys Ser	
695 700 705	
ctc gaa ata gct caa ctg ctt tat gat ttt tta gcg gaa cag caa ttg	2391
Leu Glu Ile Ala Gln Leu Leu Tyr Asp Phe Leu Ala Glu Gln Gln Leu	
710 715 720	
act cga agt gat ggt cta att gct tta ggt gga ggc gtt gtg gga gat	2439
Thr Arg Ser Asp Gly Leu Ile Ala Leu Gly Gly Gly Val Val Gly Asp	
725 730 735	
cta gct gga ttt gtc gct tca acc tat atg cgc ggt att cac ttt ttg	2487
Leu Ala Gly Phe Val Ala Ser Thr Tyr Met Arg Gly Ile His Phe Leu	

740	745	750	
caa gta cca aca acc tta ctg gca caa gta gat agt agc att gga ggt Gln Val Pro Thr Thr Leu Leu Ala Gln Val Asp Ser Ser Ile Gly Gly 755 760 765 770			2535
aaa aca gcg gtt aat act aaa aaa gcc aaa aat ctt gtc ggt act ttt Lys Thr Ala Val Asn Thr Lys Lys Ala Lys Asn Leu Val Gly Thr Phe 775 780 785			2583
gcc caa cca gat ggg gtt tta att gat cct aat aca ctt aaa aca tta Ala Gln Pro Asp Gly Val Leu Ile Asp Pro Asn Thr Leu Lys Thr Leu 790 795 800			2631
gaa cct aga cgt gtg cgt gaa gga att gca gaa att gta aaa tca gca Glu Pro Arg Arg Val Arg Glu Gly Ile Ala Glu Ile Val Lys Ser Ala 805 810 815			2679
gct atc gct gat gtt gaa ttg tgg cac cgt tta tcc tct ttg gaa aat Ala Ile Ala Asp Val Glu Leu Trp His Arg Leu Ser Ser Leu Glu Asn 820 825 830			2727
gaa caa gat tta gtg gca cat gca gaa gaa att atc acg gcc tgt tgc Glu Gln Asp Leu Val Ala His Ala Glu Glu Ile Ile Thr Ala Cys Cys 835 840 845 850			2775
aag att aaa cgt gat gtc gtc gaa gaa gat gaa tta gat ttg ggc tta Lys Ile Lys Arg Asp Val Val Glu Glu Asp Glu Leu Asp Leu Gly Leu 855 860 865			2823
cgt ttg att ctg aat ttt ggg cat acg atc ggc cac gca tta gaa aat Arg Leu Ile Leu Asn Phe Gly His Thr Ile Gly His Ala Leu Glu Asn 870 875 880			2871
aca gct ggt tac ggg gtg att gct cac ggt gaa ggc gtt tct tta gga Thr Ala Gly Tyr Gly Val Ile Ala His Gly Glu Gly Val Ser Leu Gly 885 890 895			2919
atg att caa ata act caa gtc gca gaa caa caa ggg ctt tcc cca ctt Met Ile Gln Ile Thr Gln Val Ala Glu Gln Gln Gly Leu Ser Pro Leu 900 905 910			2967
ggg act acc caa gag ttg gtc acc atg cta gaa aag ttc cat tta cca Gly Thr Thr Gln Glu Val Thr Met Leu Glu Lys Phe His Leu Pro 915 920 925 930			3015
gta acc aca gat cgt tgg tca gaa gaa cgt ctc tat caa gca att aca Val Thr Thr Asp Arg Trp Ser Glu Glu Arg Leu Tyr Gln Ala Ile Thr 935 940 945			3063
cat gat aaa aaa aca cgt ggg gga cag att aaa atc att gtc tta gaa His Asp Lys Lys Thr Arg Gly Gly Gln Ile Lys Ile Ile Val Leu Glu 950 955 960			3111
aaa att ggt caa gcg aaa att gtc tct tta cca acg gaa gaa att cga Lys Ile Gly Gln Ala Lys Ile Val Ser Leu Pro Thr Glu Glu Ile Arg 965 970 975			3159

gca ttt tta aac aga gaa gga gga att taa g atg cgc ttt att aca gca	3208
Ala Phe Leu Asn Arg Glu Gly Gly Ile Met Arg Phe Ile Thr Ala	
980 985 990	
ggc gaa tca cat gga cct gaa tta act gct att att gaa ggc tta cca	3256
Gly Glu Ser His Gly Pro Glu Leu Thr Ala Ile Ile Glu Gly Leu Pro	
995 1000 1005	
gcc ggc ttg cct tta agt agc gaa gag att aac cga gaa tta gca	3301
Ala Gly Leu Pro Leu Ser Ser Glu Glu Ile Asn Arg Glu Leu Ala	
1010 1015 1020	
aga cgt caa ggc ggt tac ggt cgt ggg gga cgg atg aaa att gaa	3346
Arg Arg Gln Gly Gly Tyr Gly Arg Gly Gly Arg Met Lys Ile Glu	
1025 1030 1035	
aaa gac caa gta cgt att act tcg ggt att cgg cat ggt aaa aca	3391
Lys Asp Gln Val Arg Ile Thr Ser Gly Ile Arg His Gly Lys Thr	
1040 1045 1050	
ctt ggc tca cca gta acg ttg att gtc gaa aac aaa gac tgg aaa	3436
Leu Gly Ser Pro Val Thr Leu Ile Val Glu Asn Lys Asp Trp Lys	
1055 1060 1065	
aat tgg acc tcc gtg atg tca gta gag cca gtt cct gaa aaa caa	3481
Asn Trp Thr Ser Val Met Ser Val Glu Pro Val Pro Glu Lys Gln	
1070 1075 1080	
aag aaa atc cgc cgc gtc agc aaa cca cgt cca gga cat gct gat	3526
Lys Lys Ile Arg Arg Val Ser Lys Pro Arg Pro Gly His Ala Asp	
1085 1090 1095	
tta gtc ggt ggc atg aaa tat caa cat gat gat tta cgg aat gtt	3571
Leu Val Gly Gly Met Lys Tyr Gln His Asp Asp Leu Arg Asn Val	
1100 1105 1110	
tta gaa cgg tct tcg gca cga gaa aca acg atg cgt gtg gcg att	3616
Leu Glu Arg Ser Ser Ala Arg Glu Thr Thr Met Arg Val Ala Ile	
1115 1120 1125	
ggt gcg gtt gct aaa aaa ctc tta gct gaa ctg gat atc caa gtc	3661
Gly Ala Val Ala Lys Lys Leu Leu Ala Glu Leu Asp Ile Gln Val	
1130 1135 1140	
gct ggg cat gtc gcg gta tta ggt ggg att gaa gct acg atc cct	3706
Ala Gly His Val Ala Val Leu Gly Gly Ile Glu Ala Thr Ile Pro	
1145 1150 1155	
gaa aat tta acg att cgt gaa att caa gaa cga tct gaa caa tct	3751
Glu Asn Leu Thr Ile Arg Glu Ile Gln Glu Arg Ser Glu Gln Ser	
1160 1165 1170	
gcc gtt cgc gta tta gat cct tcc gta gaa gaa aaa atg aaa gaa	3796
Ala Val Arg Val Leu Asp Pro Ser Val Glu Glu Lys Met Lys Glu	
1175 1180 1185	

cta	att	gac	caa	acc	aag	aaa	aat	ggc	gat	aca	att	ggt	ggg	gta	3841
Leu	Ile	Asp	Gln	Thr	Lys	Lys	Asn	Gly	Asp	Thr	Ile	Gly	Gly	Val	
1190					1195					1200					
gta	gaa	gta	ctt	gtg	ggg	ggc	gtt	cca	gct	ggc	tta	ggt	agc	tat	3886
Val	Glu	Val	Leu	Val	Gly	Gly	Val	Pro	Ala	Gly	Leu	Gly	Ser	Tyr	
1205					1210					1215					
gtc	caa	tgg	gat	cgt	aaa	cta	gat	gcc	aaa	att	gcg	caa	gca	gtt	3931
Val	Gln	Trp	Asp	Arg	Lys	Leu	Asp	Ala	Lys	Ile	Ala	Gln	Ala	Val	
1220					1225					1230					
gta	agc	atc	aac	gct	ttt	aca	ggt	gct	gag	ttt	ggc	att	gga	ttt	3976
Val	Ser	Ile	Asn	Ala	Phe	Thr	Gly	Ala	Glu	Phe	Gly	Ile	Gly	Phe	
1235					1240					1245					
gaa	atg	gca	caa	cgc	cct	ggg	agt	caa	ctg	atg	gac	gag	att	gtt	4021
Glu	Met	Ala	Gln	Arg	Pro	Gly	Ser	Gln	Leu	Met	Asp	Glu	Ile	Val	
1250					1255					1260					
tgg	gac	gaa	agt	act	ggg	tat	acc	aga	act	tcc	aac	aat	tta	ggc	4066
Trp	Asp	Glu	Ser	Thr	Gly	Tyr	Thr	Arg	Thr	Ser	Asn	Asn	Leu	Gly	
1265					1270					1275					
ggg	ttt	gaa	gga	gga	atg	acc	aac	gga	atg	cca	atc	atc	gtt	cgt	4111
Gly	Phe	Glu	Gly	Gly	Met	Thr	Asn	Gly	Met	Pro	Ile	Ile	Val	Arg	
1280					1285					1290					
ggg	gtc	atg	aaa	cct	att	cca	acc	ctt	tat	aaa	cca	tta	caa	agc	4156
Gly	Val	Met	Lys	Pro	Ile	Pro	Thr	Leu	Tyr	Lys	Pro	Leu	Gln	Ser	
1295					1300					1305					
gtg	aat	att	gat	aca	aaa	gag	cct	tat	aag	gcc	agt	gtt	gag	cgc	4201
Val	Asn	Ile	Asp	Thr	Lys	Glu	Pro	Tyr	Lys	Ala	Ser	Val	Glu	Arg	
1310					1315					1320					
tct	gat	agc	acg	gcg	gta	ccg	gcc	gct	agc	gtt	gtt	tgt	gaa	gcc	4246
Ser	Asp	Ser	Thr	Ala	Val	Pro	Ala	Ala	Ser	Val	Val	Cys	Glu	Ala	
1325					1330					1335					
gtt	gtt	gca	acg	gaa	gta	gca	aag	gct	atg	ctc	gaa	aaa	ttt	gat	4291
Val	Val	Ala	Thr	Glu	Val	Ala	Lys	Ala	Met	Leu	Glu	Lys	Phe	Asp	
1340					1345					1350					
agt	gac	tca	ttt	gaa	caa	atg	aaa	gaa	gca	gtg	aaa	cgt	tat	cgt	4336
Ser	Asp	Ser	Phe	Glu	Gln	Met	Lys	Glu	Ala	Val	Lys	Arg	Tyr	Arg	
1355					1360					1365					
cta	tat	act	caa	aac	ttt	tta	tggaagaaag	tcgcaagtat	atggagggaa						4387
Leu	Tyr	Thr	Gln	Asn	Phe										
1370					1375										
aaa	atg	aag	aaa	cgt	att	tta	atc	gta	gga	tta	ggg	cta	atc	ggg	4432
	Met	Lys	Lys	Arg	Ile	Leu	Ile	Val	Gly	Leu	Gly	Leu	Ile	Gly	
					1380					1385					
agt	tca	ctg	gct	ttg	tgt	atc	aaa	aaa	ggg	cat	cca	aac	agt	gag	4477

Ser	Ser	Leu	Ala	Leu	Cys	Ile	Lys	Lys	Gly	His	Pro	Asn	Ser	Glu	
1390					1395					1400					
att	atc	ggt	ttc	gat	aat	caa	gcg	gag	gca	act	gaa	ttt	gct	aag	4522
Ile	Ile	Gly	Phe	Asp	Asn	Gln	Ala	Glu	Ala	Thr	Glu	Phe	Ala	Lys	
1405					1410					1415					
aaa	acg	ggt	cta	att	gat	gag	ata	gct	gaa	tct	tta	aca	agt	ggg	4567
Lys	Thr	Gly	Leu	Ile	Asp	Glu	Ile	Ala	Glu	Ser	Leu	Thr	Ser	Gly	
1420					1425					1430					
gca	aga	cga	gca	gag	att	att	ttt	ctt	tgt	tcc	cca	gtt	aaa	gca	4612
Ala	Arg	Arg	Ala	Glu	Ile	Ile	Phe	Leu	Cys	Ser	Pro	Val	Lys	Ala	
1435					1440					1445					
act	tta	gta	caa	cta	gaa	gaa	tta	aac	caa	tta	tca	cta	gaa	act	4657
Thr	Leu	Val	Gln	Leu	Glu	Glu	Leu	Asn	Gln	Leu	Ser	Leu	Glu	Thr	
1450					1455					1460					
gct	ctg	atc	aca	gat	gtg	ggg	agt	acc	aag	gtg	gaa	att	aat	cag	4702
Ala	Leu	Ile	Thr	Asp	Val	Gly	Ser	Thr	Lys	Val	Glu	Ile	Asn	Gln	
1465					1470					1475					
tta	gca	aca	aag	ctt	aac	atg	aaa	aat	ttt	att	ggg	ggg	cat	cca	4747
Leu	Ala	Thr	Lys	Leu	Asn	Met	Lys	Asn	Phe	Ile	Gly	Gly	His	Pro	
1480					1485					1490					
atg	gct	ggt	tca	cat	aaa	tcc	ggc	gta	aca	gcc	gct	gat	gaa	cgt	4792
Met	Ala	Gly	Ser	His	Lys	Ser	Gly	Val	Thr	Ala	Ala	Asp	Glu	Arg	
1495					1500					1505					
ttg	ttt	gaa	aat	gcc	tac	tat	att	ttt	acc	gat	gac	cat	ggc	gaa	4837
Leu	Phe	Glu	Asn	Ala	Tyr	Tyr	Ile	Phe	Thr	Asp	Asp	His	Gly	Glu	
1510					1515					1520					
aaa	aac	aaa	cag	att	cag	gag	tta	caa	acg	tta	cta	aaa	gga	acg	4882
Lys	Asn	Lys	Gln	Ile	Gln	Glu	Leu	Gln	Thr	Leu	Leu	Lys	Gly	Thr	
1525					1530					1535					
cat	gcg	aag	ttt	att	acg	atg	cct	gca	cag	gaa	cat	gat	gaa	att	4927
His	Ala	Lys	Phe	Ile	Thr	Met	Pro	Ala	Gln	Glu	His	Asp	Glu	Ile	
1540					1545					1550					
act	ggt	gct	cta	agt	cac	ttg	cca	cat	att	gtt	gcc	gca	gcg	tta	4972
Thr	Gly	Ala	Leu	Ser	His	Leu	Pro	His	Ile	Val	Ala	Ala	Ala	Leu	
1555					1560					1565					
gtg	aac	gaa	agt	cag	caa	ctg	aat	acc	act	tac	cct	aga	gcg	cag	5017
Val	Asn	Glu	Ser	Gln	Gln	Leu	Asn	Thr	Thr	Tyr	Pro	Arg	Ala	Gln	
1570					1575					1580					
cag	cta	gcg	gct	gga	gga	ttc	aga	gat	att	act	cga	att	gct	tcc	5062
Gln	Leu	Ala	Ala	Gly	Gly	Phe	Arg	Asp	Ile	Thr	Arg	Ile	Ala	Ser	
1585					1590					1595					
tct	gat	gca	acg	atg	tgg	acg	gat	att	tta	tta	agc	aat	cgc	tta	5107
Ser	Asp	Ala	Thr	Met	Trp	Thr	Asp	Ile	Leu	Leu	Ser	Asn	Arg	Leu	

1600		1605		1610	
gta tta ttg gac tta cta	gaa aat tgg caa aaa	gag atg act act	5152		
Val Leu Leu Asp Leu Leu	Glu Asn Trp Gln Lys	Glu Met Thr Thr			
1615	1620	1625			
gtt tgc caa tgg tta aca	gaa aaa aat gcc cca	gct att cgt aat	5197		
Val Cys Gln Trp Leu Thr	Glu Lys Asn Ala Pro	Ala Ile Arg Asn			
1630	1635	1640			
ttt ttt gat aag gcc aaa	gaa aca cgt gct caa	ttg cct att cat	5242		
Phe Phe Asp Lys Ala Lys	Glu Thr Arg Ala Gln	Leu Pro Ile His			
1645	1650	1655			
aaa gaa ggc gca atc cca	gct ttc tat gat ctg	ttt gtt gat gta	5287		
Lys Glu Gly Ala Ile Pro	Ala Phe Tyr Asp Leu	Phe Val Asp Val			
1660	1665	1670			
cca gat caa cca gga atc	att gct gaa att acg	caa att tta ggc	5332		
Pro Asp Gln Pro Gly Ile	Ile Ala Glu Ile Thr	Gln Ile Leu Gly			
1675	1680	1685			
gaa gcg gac ctt tct ctt	aca aat att aaa att	tta gaa acg aga	5377		
Glu Ala Asp Leu Ser Leu	Thr Asn Ile Lys Ile	Leu Glu Thr Arg			
1690	1695	1700			
gaa gaa atc tat ggg att	ctt caa ttg tct ttt	aaa aat caa cca	5422		
Glu Glu Ile Tyr Gly Ile	Leu Gln Leu Ser Phe	Lys Asn Gln Pro			
1705	1710	1715			
gac tgc caa gct gca aaa	caa att tta tct aaa	aaa acg aac tat	5467		
Asp Cys Gln Ala Ala Lys	Gln Ile Leu Ser Lys	Lys Thr Asn Tyr			
1720	1725	1730			
acg tgt tac gaa aaa taa	gaggtg atg agg gtg	caa cta cgt aca aat	5515		
Thr Cys Tyr Glu Lys	Met Arg Val Gln Leu Arg	Thr Asn			
1735	1740	1745			
gtg aag cat tta caa ggg	act ctg atg gtt cct	agc gac aaa tcg	5560		
Val Lys His Leu Gln Gly	Thr Leu Met Val Pro	Ser Asp Lys Ser			
1750	1755	1760			
att tcc cat aga agt att	atg ttt gga gcg att	tct tct gga aaa	5605		
Ile Ser His Arg Ser Ile	Met Phe Gly Ala Ile	Ser Ser Gly Lys			
1765	1770	1775			
acg acg att aca aat ttt	cta aga ggc gaa gat	tgt tta agt acc	5650		
Thr Thr Ile Thr Asn Phe	Leu Arg Gly Glu Asp	Cys Leu Ser Thr			
1780	1785	1790			
tta gcg gcg ttt cgt tct	tta ggt gtg aac att	gaa gat gac ggg	5695		
Leu Ala Ala Phe Arg Ser	Leu Gly Val Asn Ile	Glu Asp Asp Gly			
1795	1800	1805			
acg aca atc acc gtt gag	ggg cga gga ttt gca	ggc tta aaa aag	5740		
Thr Thr Ile Thr Val Glu	Gly Arg Gly Phe Ala	Gly Leu Lys Lys			
1810	1815	1820			

gcg aag aat	aca att gat gtt	gga aat tca ggg	aca aca att	cgt	5785
Ala Lys Asn	Thr Ile Asp Val	Gly Asn Ser Gly	Thr Thr Ile	Arg	
1825		1830		1835	
ctg atg ctg	ggc att tta gct	ggc tgt ccc ttt	gaa acg cgc	cta	5830
Leu Met Leu	Gly Ile Leu Ala	Gly Cys Pro Phe	Glu Thr Arg	Leu	
1840		1845		1850	
gct ggt gat	gcg tct att gcc	aaa cga cca atg	aat cgt gta	atg	5875
Ala Gly Asp	Ala Ser Ile Ala	Lys Arg Pro Met	Asn Arg Val	Met	
1855		1860		1865	
ctt cct tta	aac caa atg gga	gcg gaa tgt caa	ggg gtt cag	caa	5920
Leu Pro Leu	Asn Gln Met Gly	Ala Glu Cys Gln	Gly Val Gln	Gln	
1870		1875		1880	
acg gag ttt	ccg cca att tct	att cgc ggg act	caa aat ttg	caa	5965
Thr Glu Phe	Pro Pro Ile Ser	Ile Arg Gly Thr	Gln Asn Leu	Gln	
1885		1890		1895	
ccg att gac	tac aca atg cct	gtt gca agt gct	caa gtt aaa	tcg	6010
Pro Ile Asp	Tyr Thr Met Pro	Val Ala Ser Ala	Gln Val Lys	Ser	
1900		1905		1910	
gct att tta	ttc gcc gct ttg	caa gcc gag ggc	act tct gta	gtg	6055
Ala Ile Leu	Phe Ala Ala Leu	Gln Ala Glu Gly	Thr Ser Val	Val	
1915		1920		1925	
gtt gag aaa	gaa aag aca cgt	gat cat aca gaa	gag atg att	cga	6100
Val Glu Lys	Glu Lys Thr Arg	Asp His Thr Glu	Glu Met Ile	Arg	
1930		1935		1940	
caa ttt ggt	ggg aca ctt gaa	gta gac ggt aaa	aaa att atg	tta	6145
Gln Phe Gly	Gly Thr Leu Glu	Val Asp Gly Lys	Lys Ile Met	Leu	
1945		1950		1955	
act gga ccg	caa caa tta aca	ggt caa aat gtg	gta gtt cct	ggt	6190
Thr Gly Pro	Gln Gln Leu Thr	Gly Gln Asn Val	Val Val Pro	Gly	
1960		1965		1970	
gat atc tct	tct gca gct ttc	ttt tta gtt gcg	ggt tta gta	gtc	6235
Asp Ile Ser	Ser Ala Ala Phe	Phe Leu Val Ala	Gly Leu Val	Val	
1975		1980		1985	
cca gat agc	gag ata ctt ctg	aaa aat gtt ggc	tta aat caa	acg	6280
Pro Asp Ser	Glu Ile Leu Leu	Lys Asn Val Gly	Leu Asn Gln	Thr	
1990		1995		2000	
cgg aca ggt	att tta gat gtg	att aaa aac atg	ggc ggt tcc	gtc	6325
Arg Thr Gly	Ile Leu Asp Val	Ile Lys Asn Met	Gly Gly Ser	Val	
2005		2010		2015	
act att tta	aat gaa gat gag	gcc aat cat tct	ggc gat tta	ctt	6370
Thr Ile Leu	Asn Glu Asp Glu	Ala Asn His Ser	Gly Asp Leu	Leu	
2020		2025		2030	

gta aaa acg	agt caa tta aca gct	aca gag att ggt ggc	gct att	6415
Val Lys Thr	Ser Gln Leu Thr Ala	Thr Glu Ile Gly Gly	Ala Ile	
2035	2040	2045		
atc cca cgt	tta att gat gag tta	ccg att att gct ttg	tta gct	6460
Ile Pro Arg	Leu Ile Asp Glu Leu	Pro Ile Ile Ala Leu	Leu Ala	
2050	2055	2060		
act cag gct	act ggc acg aca atc	att cga gat gca gaa	gaa ttg	6505
Thr Gln Ala	Thr Gly Thr Thr Ile	Ile Arg Asp Ala Glu	Glu Leu	
2065	2070	2075		
aaa gtc aaa	gaa acc aat cgg att	gat gca gta gcg aaa	gaa tta	6550
Lys Val Lys	Glu Thr Asn Arg Ile	Asp Ala Val Ala Lys	Glu Leu	
2080	2085	2090		
aca att tta	ggc gcc gac atc acg	cct act gat gat ggc	tta att	6595
Thr Ile Leu	Gly Ala Asp Ile Thr	Pro Thr Asp Asp Gly	Leu Ile	
2095	2100	2105		
ata cat gga	cca act tct tta cat	ggg gga aga gtt acc	agt tat	6640
Ile His Gly	Pro Thr Ser Leu His	Gly Gly Arg Val Thr	Ser Tyr	
2110	2115	2120		
ggg gat cat	cgt atc ggg atg atg	tta caa att gct gca	tta ctt	6685
Gly Asp His	Arg Ile Gly Met Met	Leu Gln Ile Ala Ala	Leu Leu	
2125	2130	2135		
gta aaa gaa	ggc act gtt gaa tta	gat aag gct gaa gca	gtt tca	6730
Val Lys Glu	Gly Thr Val Glu Leu	Asp Lys Ala Glu Ala	Val Ser	
2140	2145	2150		
gtt tct tat	cca gca ttt ttt gac	gac tta gaa cgt tta	agt tgt	6775
Val Ser Tyr	Pro Ala Phe Phe Asp	Asp Leu Glu Arg Leu	Ser Cys	
2155	2160	2165		
taa cgaaggagga	taacga acc atg gaa	agc att gtt tta att	ggg ttc	6824
	Thr Met Glu	Ser Ile Val Leu Ile	Gly Phe	
	2170	2175		
atg ggt gcg	ggg aaa aca act atc	ggc caa agt ttg gcc	aat aaa	6869
Met Gly Ala	Gly Lys Thr Thr Ile	Gly Gln Ser Leu Ala	Asn Lys	
2180	2185	2190		
ctg aag atg	cct cat ctt gat tta	gat aca gcg tta att	gaa aaa	6914
Leu Lys Met	Pro His Leu Asp Leu	Asp Thr Ala Leu Ile	Glu Lys	
2195	2200	2205		
ata gga gcg	tca att cct gac tat	ttc gaa aaa tat ggt	gaa gca	6959
Ile Gly Arg	Ser Ile Pro Asp Tyr	Phe Glu Lys Tyr Gly	Glu Ala	
2210	2215	2220		
gct ttc cga	gaa cag gaa acc caa	ctt tta aag gag ctg	tca aaa	7004
Ala Phe Arg	Glu Gln Glu Thr Gln	Leu Leu Lys Glu Leu	Ser Lys	
2225	2230	2235		
aat aca gcc	gtc ctt tca act ggg	ggc ggg att gtt gtc	gga cca	7049

Asn Thr Ala Val Leu Ser Thr Gly Gly Gly Ile Val Val Gly Pro	
2240 2245 2250	
gaa aat cgt agc tta tta aaa tct ttt cag caa gtg att tat tta	7094
Glu Asn Arg Ser Leu Leu Lys Ser Phe Gln Gln Val Ile Tyr Leu	
2255 2260 2265	
cat gcg aca cca gaa gag ctg tta aaa aga atc aca gaa gat act	7139
His Ala Thr Pro Glu Glu Leu Lys Arg Ile Thr Glu Asp Thr	
2270 2275 2280	
gaa aac caa cgg ccc tta gct ata gaa cgt tct tca aaa gaa atc	7184
Glu Asn Gln Arg Pro Leu Ala Ile Glu Arg Ser Ser Lys Glu Ile	
2285 2290 2295	
att act ttg ttt gag tct cgt aaa aat ttt tat gaa gaa tgt gcg	7229
Ile Thr Leu Phe Glu Ser Arg Lys Asn Phe Tyr Glu Glu Cys Ala	
2300 2305 2310	
aag atg aca att gat acg acc aat cgc tcg cca gaa gaa att atc	7274
Lys Met Thr Ile Asp Thr Thr Asn Arg Ser Pro Glu Glu Ile Ile	
2315 2320 2325	
aat gaa att ctg caa caa tta aag gag tag agaaacg atg aaa gtt	7320
Asn Glu Ile Leu Gln Gln Leu Lys Glu Met Lys Val	
2330 2335	
ggt tat tta ggt ccg att ggt tcc ttt acg tac agt gca acg ttg	7365
Gly Tyr Leu Gly Pro Ile Gly Ser Phe Thr Tyr Ser Ala Thr Leu	
2340 2345 2350	
gct gct ttt cct gaa gct acg ttg atg ccg tac gca tcg att cca	7410
Ala Ala Phe Pro Glu Ala Thr Leu Met Pro Tyr Ala Ser Ile Pro	
2355 2360 2365	
gct tgc ttg aaa gca att gaa cag caa gaa gtg gca tgg agc att	7455
Ala Cys Leu Lys Ala Ile Glu Gln Gln Glu Val Ala Trp Ser Ile	
2370 2375 2380	
atc cca ata gaa aac acg att gaa gga act gtt aac gca tcg ata	7500
Ile Pro Ile Glu Asn Thr Ile Glu Gly Thr Val Asn Ala Ser Ile	
2385 2390 2395	
gat tat ttg tat cat caa gcg cag tta cct gtc caa gca gag tta	7545
Asp Tyr Leu Tyr His Gln Ala Gln Leu Pro Val Gln Ala Glu Leu	
2400 2405 2410	
gtt tta ccg att caa caa caa tta atg gtg gca aaa gag aat caa	7590
Val Leu Pro Ile Gln Gln Gln Leu Met Val Ala Lys Glu Asn Gln	
2415 2420 2425	
gcg atc tgg caa caa agt cag aaa att tta tca cat ccg caa gca	7635
Ala Ile Trp Gln Gln Ser Gln Lys Ile Leu Ser His Pro Gln Ala	
2430 2435 2440	
tta gct caa tcg cag atg ttt cta gag aaa aac ttt cca gaa gcg	7680
Leu Ala Gln Ser Gln Met Phe Leu Glu Lys Asn Phe Pro Glu Ala	

2445	2450	2455	
att tta gaa gca aca cct tca aca gct tac gcc gcc aaa tac att			7725
Ile Leu Glu Ala Thr Pro Ser Thr Ala Tyr Ala Ala Lys Tyr Ile			
2460	2465	2470	
gca gaa cat cca gaa tta cct ttt gca gct att gca cca aaa ctt			7770
Ala Glu His Pro Glu Leu Pro Phe Ala Ala Ile Ala Pro Lys Leu			
2475	2480	2485	
tct gcg gaa atg tat gat ttg acc att gtt gaa aaa aat ata caa			7815
Ser Ala Glu Met Tyr Asp Leu Thr Ile Val Glu Lys Asn Ile Gln			
2490	2495	2500	
gat tta tcg gta aat caa acc cga ttt tgg gtt ctt ggt tct gaa			7860
Asp Leu Ser Val Asn Gln Thr Arg Phe Trp Val Leu Gly Ser Glu			
2505	2510	2515	
aat tta gcg att tct ttc ccg cta tct gag aaa aaa ata aca ctg			7905
Asn Leu Ala Ile Ser Phe Pro Leu Ser Glu Lys Lys Ile Thr Leu			
2520	2525	2530	
gcg att acg atg cca agt aat gtt cct ggc tct tta cac aaa gta			7950
Ala Ile Thr Met Pro Ser Asn Val Pro Gly Ser Leu His Lys Val			
2535	2540	2545	
tta agc gtg ttt agt tgg cga ggg att aat ctt agc aaa ata gaa			7995
Leu Ser Val Phe Ser Trp Arg Gly Ile Asn Leu Ser Lys Ile Glu			
2550	2555	2560	
tcg cgg ccg ttg aaa aca aag cta gga gag tac ttc ttt tta atg			8040
Ser Arg Pro Leu Lys Thr Lys Leu Gly Glu Tyr Phe Phe Leu Met			
2565	2570	2575	
gac tta gtg aaa gat caa cca gaa aaa tta att gaa gca gcc tta			8085
Asp Leu Val Lys Asp Gln Pro Glu Lys Leu Ile Glu Ala Ala Leu			
2580	2585	2590	
aca gaa ctg gaa ctc att ggt gca gaa ata aaa att tta ggg gat			8130
Thr Glu Leu Glu Leu Ile Gly Ala Glu Ile Lys Ile Leu Gly Asp			
2595	2600	2605	
tac ccg atc tat gtt ttg tcc aca ctt taa agagttaaaa atgaaaatga			8180
Tyr Pro Ile Tyr Val Leu Ser Thr Leu			
2610	2615		
agcttactta ttagataaag tgagtttcat tttttattaa attacatatt tgtaatagga			8240
atttcctgtg aaatgaggta tctaagaaa ggtgataaaa cacagaggta aaggagtgc			8300
acgatgagtc gtgtagatcg ttataaacat attcatgaaa tcttttc			8347

<210> 32
 <211> 867
 <212> DNA
 <213> Enterococcus faecalis

<400> 32
atgaaagaaa taactggagc cactcggttta gctgggctat tcgcgaaacc cagccaacac 60
agtatttcac cggttgattca taatacagca tttcaaaatt taggagttga tgctcggtat 120
ctggcgtttg acgttggaca agagacattg ccacaagcaa ttgaagcgat tcgaacgttt 180
cacatgttag gggccaactt atcaatgccc aataaagtgg cggctgtaag ttatatggat 240
gaactaagtc ctaccgctca actgggtggc gcaattaata cgattgtcaa caaagatgga 300
aaactttacg gagacagcac ggatgggtact gggtttatgt ggagtttgaa agagaaaaag 360
gttgacgttt ttcagaataa aatgaccatc ttaggaacag gtggtgcagc cttatcaatc 420
attgcccaag ctgctttaga tggcgtgaaa gaaatcgccg tttacaacag gaaaagcgcg 480
ggctttaacg acagtcaaaa aaaactggca aatttactg aacgaaccaa ctgtgtaatt 540
catttaaacg atttagcgga tactgaaaaa ctagcaaaag atgttgctga aagcgtcttg 600
ttagttaatg caacgagtgt gggatatgcat ccacatgccc atagtagtcc tatagaaaat 660
tatgcaatga ttcaaccgaa gttatttgtg tatgatgcta tttataatcc cagagaaaca 720
cagttattaa aagaagcccg tttacgtggc gcagaaacaa gcaacggctt ggacatgcta 780
ctttatcaag gcgctgctgc ttttgaacaa tggacaggac aaaaaatgcc tgtatcagtc 840
gtaaaacgta aaattgaaaa tagataa 867

<210> 33
<211> 1026
<212> DNA
<213> Enterococcus faecalis

<400> 33
atgatcgtaa ttatgaaaga aaatgcaacc gaaaagcaaa tgaaacaagt cattgattta 60
gtaacaggtg caggcttaac tactcaaaca agtcaagata atggaaaaac agtgataggc 120
ttgattggtg atacagaaaa attagttgaa gcagagttaa cagcattaga aggcgtggag 180
aaaagtgtcc gcatttcggt gtcttacaaa ctaacgagtc gtttatttca tccagagaat 240
acagtgggtg atgtgaacgg tgttaaaatc ggtgacggca gtatgaccat gatggcgggc 300
ccttgttcaa tcgaaagctt agatcagatt cgcgaatgtg cgcgaattgc taaagctgga 360
ggtgcaacaa ttttacgagg tgggtgcattc aaacctagaa cgtcgccata cgctttccaa 420
ggactagaag aagaaggact aaaatacatt cgccaagcgg ctgatgaatt agatatgcaa 480
gtcattacag aagtgatgga tgaagcgaat ttagaacttg tcgcaaaata cagtgcatt 540

ttacaaatcg gtgcgcgcaa catgcaaaat ttcaagttat tacaagcggg tggtaaaact	600
ggaaaaccta ttggcttaaa acgcgggatt gctggtacga ttgatgaatg gctaaacgca	660
gctgaataca ttgctgcgca aggaaatttc aatgtgatct tcattgaacg tgggattcgt	720
acgtacgaaa ccgtacgcg caatacactt gatttaagtg cggcgccttt aattaaaaa	780
ttaagtcatt ttccaattat tgttgatccg agtcatggtg ttggtatctg ggatttagta	840
ccgccaatgg cccgagcagg tgttgcttca ggtgcggacg gcttgattgt agaaattcat	900
ccagatccag cgaatgcgtg gtcagatggg ccacaatcct tgaatgaaaa aacttaccta	960
cgtatgatga aagaagttca tatcatcgaa aaagcaatga aagaaattaa tgctttagaa	1020
gattag	1026

<210> 34
 <211> 1077
 <212> DNA
 <213> Enterococcus faecalis

<400> 34	
atgaaattaa ccgtaacgtt acctacacat tcatatgatt taaccatcga aacagggtgcc	60
ttagataaaa ttggcacctg ggtacgtagc ctgtggcagc cacaacgggt agcgattatt	120
accgatgaaa cgggtgaataa attatatggc gcagctgttg agaaagaatt gcaagctgct	180
ggttttgaaa catcattgat tgctgtagcg gcagggtgaac aaagtaagag cctcgaaata	240
gctcaactgc tttatgattt tttagcggaa cagcaattga ctcgaagtga tggctctaatt	300
gcttttaggtg gaggcgttgt gggagatcta gctggatttg tcgcttcaac ctatatgcgc	360
ggtattcact ttttgcaagt accaacaacc ttactggcac aagtagatag tagcattgga	420
ggtaaaacag cggttaatac taaaaaagcc aaaaatcttg tcgggtacttt tgcccaacca	480
gatgggggtt taattgatcc taatacactt aaaacattag aacctagacg tgtgcgtgaa	540
ggaattgcag aaattgtaaa atcagcagct atcgctgatg ttgaattgtg gcaccgttta	600
tcctctttgg aaaatgaaca agatttagtg gcacatgcag aagaaattat cacggcctgt	660
tgcaagatta aacgtgatgt cgtcgaagaa gatgaattag atttgggctt acgtttgatt	720
ctgaattttg ggcatacgat cggccacgca ttagaaaata cagctgggta cggggtgatt	780
gctcacgggtg aaggcgtttc tttaggaatg attcaaataa ctcaagtcgc agaacaacaa	840
gggctttccc cacttgggac taccgaagag ttggtcacca tgctagaaaa gttccattta	900
ccagtaacca cagatcgttg gtcagaagaa cgtctctatc aagcaattac acatgataaa	960

aaaacacgtg ggggacagat taaaatcatt gtcttagaaa aaattggtca agcgaaaatt 1020
 gtctctttac caacggaaga aattcgagca tttttaaaca gagaaggagg aatttaa 1077

<210> 35
 <211> 1167
 <212> DNA
 <213> Enterococcus faecalis

<400> 35
 atgcgcttta ttacagcagg cgaatcacat ggacctgaat taactgctat tattgaaggc 60
 ttaccagccg gcttgccctt aagtagcgaa gagattaacc gagaattagc aagacgtcaa 120
 ggcggttacg gtcgtggggg acggatgaaa attgaaaaag accaagtacg tattacttcg 180
 ggtattcggc atggtaaaac acttggtctca ccagtaacgt tgattgtcga aaacaaagac 240
 tggaaaaatt ggacctccgt gatgtcagta gagccagttc ctgaaaaaca aaagaaaatc 300
 cgccgcgtca gcaaaccacg tccaggacat gctgatttag tcggtggcat gaaatatcaa 360
 catgatgatt tacggaatgt tttagaacgg tcttcggcac gagaaacaac gatgcgtgtg 420
 gcgattggtg cggttgctaa aaaactctta gctgaactgg atatccaagt cgctgggcat 480
 gtcgcggtat taggtgggat tgaagctacg atccctgaaa atttaacgat tcgtgaaatt 540
 caagaacgat ctgaacaatc tgccgttcgc gtattagatc cttccgtaga agaaaaaatg 600
 aaagaactaa ttgaccaaac caagaaaaat ggcgatacaa ttggtggggg agtagaagta 660
 cttgtgggtg gcgttcacg tggcttaggt agctatgtcc aatgggatcg taaactagat 720
 gccaaaattg cgcaagcagt tgtaagcatc aacgctttta caggtgctga gtttggcatt 780
 ggatttgaaa tggcacaacg ccctggtagt caactgatgg acgagattgt ttgggacgaa 840
 agtactgggt ataccagaac ttccaacaat ttaggcgggt ttgaaggagg aatgaccaac 900
 ggaatgccaa tcatcgttcg tgggtgcatg aaacctattc caaccttta taaaccatta 960
 caaagcgtga atattgatac aaaagagcct tataaggcca gtgttgagcg ctctgatagc 1020
 acggcggtac cgcccgctag cgttgtttgt gaagccgttg ttgcaacgga agtagcaaag 1080
 gctatgctcg aaaaatttga tagtgactca tttgaacaaa tgaaagaagc agtgaaacgt 1140
 tatcgtctat atactcaaaa cttttaa 1167

<210> 36
 <211> 1095
 <212> DNA
 <213> Enterococcus faecalis

<400> 36
atgaagaaac gtattttaat cgtaggatta gggctaatacg ggagttcact ggctttgtgt 60
atcaaaaaag ggcattccaa cagtgaagatt atcggtttcg ataatacaagc ggaggcaact 120
gaatttgcta agaaaacggg tctaattgat gagatagctg aatctttaac aagtggggca 180
agacgagcag agattatatt tctttgttcc ccagttaaag caactttagt acaactagaa 240
gaattaaacc aattatcact agaaactgct ctgatcacag atgtgggtag taccaagggtg 300
gaaattaatc agtttagcaac aaagcttaac atgaaaaatt ttattgggtg tcatccaatg 360
gctgggttcac ataaatccgg cgtaacagcc gctgatgaac gtttgtttga aaatgcctac 420
tatatttttta ccgatgacca tggcgaaaaa acaaacaga ttcaggagtt acaaactgta 480
ctaaaaggaa cgcattgcga gtttattacg atgcctgcac aggaacatga tgaaattact 540
gggtgctctaa gtcacttgcc acatattggt gccgcagcgt tagtgaacga aagtcagcaa 600
ctgaatacca cttaccctag agcgcagcag ctagcggtg gaggattcag agatattact 660
cgaattgctt cctctgatgc aacgatgtgg acggatattt tattaagcaa tcgcttagta 720
ttattggact tactagaaaa ttggcaaaaa gagatgacta ctgtttgcca atggttaaca 780
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gatcaaccag gaatcattgc tgaaattacg caaattttag gcgaagcgga cctttctctt 960
acaaatatta aaattttaga aacgagagaa gaaatctatg ggattcttca attgtctttt 1020
aaaaatcaac cagactgcca agctgcaaaa caaattttat ctaaaaaac gaactatacg 1080
tgttacgaaa aataa 1095

<210> 37
<211> 1287
<212> DNA
<213> *Enterococcus faecalis*

<400> 37
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gacaaatcga tttcccatag aagtattatg tttggagcga tttcttctgg aaaaacgacg 120
attacaaatt ttctaagagg cgaagattgt ttaagtacct tagcggcggt tcgttcttta 180
gggtgtgaaca ttgaagatga cgggacgaca atcacggtt aggggagagg atttgcaggc 240
ttaaaaaagg cgaagaatac aattgatgtt ggaaattcag ggacaacaat tcgtctgatg 300
ctgggcattt tagctggctg tccctttgaa acgcgcctag ctggtgatgc gtctattgcc 360

aaacgaccaa tgaatcgtgt aatgcttcct ttaaaccaaa tgggagcgga atgtcaaggg	420
gttcagcaaa cggagtttcc gccaatctct attcgcggga ctcaaaattt gcaaccgatt	480
gactacacaa tgctgttgc aagtgtcaa gttaaatacg ctattttatt cgccgctttg	540
caagccgagg gcacttctgt agtggttgag aaagaaaaga cacgtgatca tacagaagag	600
atgattcgac aatttggtgg gacacttgaa gtagacggta aaaaaattat gttaactgga	660
ccgcaacaat taacaggtca aaatgtggta gttcctggtg atatctcttc tgcagctttc	720
tttttagttg cgggtttagt agtccagat agcgagatac ttctgaaaaa tgttggttta	780
aatcaaacgc ggacaggtat tttagatgtg attaaaaaca tgggcgggtc cgtcactatt	840
ttaaatagaag atgaggccaa tcattctggc gatttacttg taaaaacgag tcaattaaca	900
gctacagaga ttggtggcgc tattatccca cgtttaattg atgagttacc gattattgct	960
ttgttagcta ctcaggctac tggcacgaca atcattcgag atgcagaaga attgaaagtc	1020
aaagaaacca atcggattga tgcagtagcg aaagaattaa caattttagg cgccgacatc	1080
acgcctactg atgatggctt aattatacat ggaccaactt ctttacatgg tggaagagtt	1140
accagttatg gggatcatcg tatcgggatg atgttacaaa ttgctgcatt acttgtaaaa	1200
gaaggcactg ttgaattaga taaggctgaa gcagtttcag tttcttatcc agcatttttt	1260
gacgacttag aacgtttaag ttgttaa	1287

<210> 38
 <211> 507
 <212> DNA
 <213> Enterococcus faecalis

<400> 38	
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ttggccaata aactgaagat gcctcatctt gatttagata cagcgttaat tgaaaaata	120
ggacgtcaa ttcctgacta tttcgaaaaa tatggtgaag cagctttccg agaacaggaa	180
accaactttt taaaggagct gtcaaaaaat acagccgtcc tttcaactgg gggcgggatt	240
gttgctggac cagaaaatcg tagcttatta aaatcttttc agcaagtgat ttatttacat	300
gcgacaccag aagagctgtt aaaaagaatc acagaagata ctgaaaacca acggccctta	360
gctatagaac gttcttcaaa agaaatcatt actttgtttg agtctcgtaa aaatttttat	420
gaagaatgtg cgaagatgac aattgatacg accaatcgct cgccagaaga aattatcaat	480
gaaattctgc aacaattaaa ggagtag	507

<210> 39
 <211> 849
 <212> DNA
 <213> Enterococcus faecalis

<400> 39
 atgaaagttg gttatttagg tccgattggg tcctttacgt acagtgcac gttggctgct 60
 tttcctgaag ctacgttgat gccgtacgca tcgattccag cttgcttgaa agcaattgaa 120
 cagcaagaag tggcatggag cattatccca atagaaaaca cgattgaagg aactgttaac 180
 gcatcgatag attatttgta tcatcaagcg cagttacctg tccaagcaga gttagtttta 240
 ccgattcaac aacaattaat ggtggcaaaa gagaatcaag cgatctggca acaaagtcag 300
 aaaattttat cacatccgca agcattagct caatcgcaga tgtttctaga gaaaaacttt 360
 ccagaagcga ttttagaagc aacaccttca acagcttacg ccgccaaata cattgcagaa 420
 catccagaat taccttttgc agctattgca ccaaaacttt ctgcggaaat gtatgatttg 480
 accattgttg aaaaaaatat acaagattta tcggtaaatc aaaccgcatt ttgggttctt 540
 ggttctgaaa atttagcgat ttctttcccg ctatctgaga aaaaaataac actggcgatt 600
 acgatgccaa gtaatgttcc tggctcttta cacaaagtat taagcgtggt tagttggcga 660
 gggattaatc ttagcaaaat agaatcgcg ccggtgaaaa caaagctagg agagtacttc 720
 tttttaatgg acttagtgaa agatcaacca gaaaaattaa ttgaagcagc cttaacagaa 780
 ctggaactca ttggtgcaga aataaaaatt ttaggggatt acccgatcta tgttttgtcc 840
 acactttaa 849

<210> 40
 <211> 288
 <212> PRT
 <213> Enterococcus faecalis

<400> 40
 Met Lys Glu Ile Thr Gly Ala Thr Arg Leu Ala Gly Leu Phe Ala Lys
 1 5 10 15
 Pro Ser Gln His Ser Ile Ser Pro Leu Ile His Asn Thr Ala Phe Gln
 20 25 30
 Asn Leu Gly Val Asp Ala Arg Tyr Leu Ala Phe Asp Val Gly Gln Glu
 35 40 45

Thr Leu Pro Gln Ala Ile Glu Ala Ile Arg Thr Phe His Met Leu Gly
50 55 60

Ala Asn Leu Ser Met Pro Asn Lys Val Ala Ala Val Ser Tyr Met Asp
65 70 75 80

Glu Leu Ser Pro Thr Ala Gln Leu Val Gly Ala Ile Asn Thr Ile Val
85 90 95

Asn Lys Asp Gly Lys Leu Tyr Gly Asp Ser Thr Asp Gly Thr Gly Phe
100 105 110

Met Trp Ser Leu Lys Glu Lys Lys Val Asp Val Phe Gln Asn Lys Met
115 120 125

Thr Ile Leu Gly Thr Gly Gly Ala Ala Leu Ser Ile Ile Ala Gln Ala
130 135 140

Ala Leu Asp Gly Val Lys Glu Ile Ala Val Tyr Asn Arg Lys Ser Ala
145 150 155 160

Gly Phe Asn Asp Ser Gln Lys Lys Leu Ala Asn Phe Thr Glu Arg Thr
165 170 175

Asn Cys Val Ile His Leu Asn Asp Leu Ala Asp Thr Glu Lys Leu Ala
180 185 190

Lys Asp Val Ala Glu Ser Val Leu Leu Val Asn Ala Thr Ser Val Gly
195 200 205

Met His Pro His Ala His Ser Ser Pro Ile Glu Asn Tyr Ala Met Ile
210 215 220

Gln Pro Lys Leu Phe Val Tyr Asp Ala Ile Tyr Asn Pro Arg Glu Thr
225 230 235 240

Gln Leu Leu Lys Glu Ala Arg Leu Arg Gly Ala Glu Thr Ser Asn Gly
245 250 255

Leu Asp Met Leu Leu Tyr Gln Gly Ala Ala Ala Phe Glu Gln Trp Thr
260 265 270

Gly Gln Lys Met Pro Val Ser Val Val Lys Arg Lys Ile Glu Asn Arg
 275 280 285

<210> 41
 <211> 341
 <212> PRT
 <213> Enterococcus faecalis

<400> 41

Met Ile Val Ile Met Lys Glu Asn Ala Thr Glu Lys Gln Met Lys Gln
 1 5 10 15

Val Ile Asp Leu Val Thr Gly Ala Gly Leu Thr Thr Gln Thr Ser Gln
 20 25 30

Asp Asn Gly Lys Thr Val Ile Gly Leu Ile Gly Asp Thr Glu Lys Leu
 35 40 45

Val Glu Ala Glu Leu Thr Ala Leu Glu Gly Val Glu Lys Ser Val Arg
 50 55 60

Ile Ser Leu Ser Tyr Lys Leu Thr Ser Arg Leu Phe His Pro Glu Asn
 65 70 75 80

Thr Val Val Asp Val Asn Gly Val Lys Ile Gly Asp Gly Ser Met Thr
 85 90 95

Met Met Ala Gly Pro Cys Ser Ile Glu Ser Leu Asp Gln Ile Arg Glu
 100 105 110

Cys Ala Arg Ile Ala Lys Ala Gly Gly Ala Thr Ile Leu Arg Gly Gly
 115 120 125

Ala Phe Lys Pro Arg Thr Ser Pro Tyr Ala Phe Gln Gly Leu Glu Glu
 130 135 140

Glu Gly Leu Lys Tyr Ile Arg Gln Ala Ala Asp Glu Leu Asp Met Gln
 145 150 155 160

Val Ile Thr Glu Val Met Asp Glu Ala Asn Leu Glu Leu Val Ala Lys
 165 170 175

Tyr Ser Asp Ile Leu Gln Ile Gly Ala Arg Asn Met Gln Asn Phe Lys
 180 185 190

Leu Leu Gln Ala Val Gly Lys Thr Gly Lys Pro Ile Gly Leu Lys Arg
 195 200 205

Gly Ile Ala Gly Thr Ile Asp Glu Trp Leu Asn Ala Ala Glu Tyr Ile
 210 215 220

Ala Ala Gln Gly Asn Phe Asn Val Ile Phe Ile Glu Arg Gly Ile Arg
 225 230 235 240

Thr Tyr Glu Thr Ala Thr Arg Asn Thr Leu Asp Leu Ser Ala Val Pro
 245 250 255

Leu Ile Lys Lys Leu Ser His Phe Pro Ile Ile Val Asp Pro Ser His
 260 265 270

Gly Val Gly Ile Trp Asp Leu Val Pro Pro Met Ala Arg Ala Gly Val
 275 280 285

Ala Ser Gly Ala Asp Gly Leu Ile Val Glu Ile His Pro Asp Pro Ala
 290 295 300

Asn Ala Trp Ser Asp Gly Pro Gln Ser Leu Asn Glu Lys Thr Tyr Leu
 305 310 315 320

Arg Met Met Lys Glu Val His Ile Ile Glu Lys Ala Met Lys Glu Ile
 325 330 335

Asn Ala Leu Glu Asp
 340

<210> 42
 <211> 358
 <212> PRT
 <213> Enterococcus faecalis

<400> 42

Met Lys Leu Thr Val Thr Leu Pro Thr His Ser Tyr Asp Leu Thr Ile
 1 5 10 15

Glu Thr Gly Ala Leu Asp Lys Ile Gly Thr Trp Val Arg Ser Leu Trp
 20 25 30

Gln Pro Gln Arg Val Ala Ile Ile Thr Asp Glu Thr Val Asn Lys Leu
35 40 45

Tyr Gly Ala Ala Val Glu Lys Glu Leu Gln Ala Ala Gly Phe Glu Thr
50 55 60

Ser Leu Ile Ala Val Ala Ala Gly Glu Gln Ser Lys Ser Leu Glu Ile
65 70 75 80

Ala Gln Leu Leu Tyr Asp Phe Leu Ala Glu Gln Gln Leu Thr Arg Ser
85 90 95

Asp Gly Leu Ile Ala Leu Gly Gly Gly Val Val Gly Asp Leu Ala Gly
100 105 110

Phe Val Ala Ser Thr Tyr Met Arg Gly Ile His Phe Leu Gln Val Pro
115 120 125

Thr Thr Leu Leu Ala Gln Val Asp Ser Ser Ile Gly Gly Lys Thr Ala
130 135 140

Val Asn Thr Lys Lys Ala Lys Asn Leu Val Gly Thr Phe Ala Gln Pro
145 150 155 160

Asp Gly Val Leu Ile Asp Pro Asn Thr Leu Lys Thr Leu Glu Pro Arg
165 170 175

Arg Val Arg Glu Gly Ile Ala Glu Ile Val Lys Ser Ala Ala Ile Ala
180 185 190

Asp Val Glu Leu Trp His Arg Leu Ser Ser Leu Glu Asn Glu Gln Asp
195 200 205

Leu Val Ala His Ala Glu Glu Ile Ile Thr Ala Cys Cys Lys Ile Lys
210 215 220

Arg Asp Val Val Glu Glu Asp Glu Leu Asp Leu Gly Leu Arg Leu Ile
225 230 235 240

Leu Asn Phe Gly His Thr Ile Gly His Ala Leu Glu Asn Thr Ala Gly
245 250 255

Tyr Gly Val Ile Ala His Gly Glu Gly Val Ser Leu Gly Met Ile Gln

260	265	270
Ile Thr Gln Val Ala Glu Gln Gln Gly Leu Ser Pro Leu Gly Thr Thr		
275	280	285
Gln Glu Leu Val Thr Met Leu Glu Lys Phe His Leu Pro Val Thr Thr		
290	295	300
Asp Arg Trp Ser Glu Glu Arg Leu Tyr Gln Ala Ile Thr His Asp Lys		
305	310	315 320
Lys Thr Arg Gly Gly Gln Ile Lys Ile Ile Val Leu Glu Lys Ile Gly		
325	330	335
Gln Ala Lys Ile Val Ser Leu Pro Thr Glu Glu Ile Arg Ala Phe Leu		
340	345	350
Asn Arg Glu Gly Gly Ile		
355		
<210> 43		
<211> 388		
<212> PRT		
<213> Enterococcus faecalis		
<400> 43		
Met Arg Phe Ile Thr Ala Gly Glu Ser His Gly Pro Glu Leu Thr Ala		
1	5	10 15
Ile Ile Glu Gly Leu Pro Ala Gly Leu Pro Leu Ser Ser Glu Glu Ile		
20	25	30
Asn Arg Glu Leu Ala Arg Arg Gln Gly Gly Tyr Gly Arg Gly Gly Arg		
35	40	45
Met Lys Ile Glu Lys Asp Gln Val Arg Ile Thr Ser Gly Ile Arg His		
50	55	60
Gly Lys Thr Leu Gly Ser Pro Val Thr Leu Ile Val Glu Asn Lys Asp		
65	70	75 80
Trp Lys Asn Trp Thr Ser Val Met Ser Val Glu Pro Val Pro Glu Lys		
85	90	95

Gln Lys Lys Ile Arg Arg Val Ser Lys Pro Arg Pro Gly His Ala Asp
 100 105 110

Leu Val Gly Gly Met Lys Tyr Gln His Asp Asp Leu Arg Asn Val Leu
 115 120 125

Glu Arg Ser Ser Ala Arg Glu Thr Thr Met Arg Val Ala Ile Gly Ala
 130 135 140

Val Ala Lys Lys Leu Leu Ala Glu Leu Asp Ile Gln Val Ala Gly His
 145 150 155 160

Val Ala Val Leu Gly Gly Ile Glu Ala Thr Ile Pro Glu Asn Leu Thr
 165 170 175

Ile Arg Glu Ile Gln Glu Arg Ser Glu Gln Ser Ala Val Arg Val Leu
 180 185 190

Asp Pro Ser Val Glu Glu Lys Met Lys Glu Leu Ile Asp Gln Thr Lys
 195 200 205

Lys Asn Gly Asp Thr Ile Gly Gly Val Val Glu Val Leu Val Gly Gly
 210 215 220

Val Pro Ala Gly Leu Gly Ser Tyr Val Gln Trp Asp Arg Lys Leu Asp
 225 230 235 240

Ala Lys Ile Ala Gln Ala Val Val Ser Ile Asn Ala Phe Thr Gly Ala
 245 250 255

Glu Phe Gly Ile Gly Phe Glu Met Ala Gln Arg Pro Gly Ser Gln Leu
 260 265 270

Met Asp Glu Ile Val Trp Asp Glu Ser Thr Gly Tyr Thr Arg Thr Ser
 275 280 285

Asn Asn Leu Gly Gly Phe Glu Gly Gly Met Thr Asn Gly Met Pro Ile
 290 295 300

Ile Val Arg Gly Val Met Lys Pro Ile Pro Thr Leu Tyr Lys Pro Leu
 305 310 315 320

Gln Ser Val Asn Ile Asp Thr Lys Glu Pro Tyr Lys Ala Ser Val Glu
325 330 335

Arg Ser Asp Ser Thr Ala Val Pro Ala Ala Ser Val Val Cys Glu Ala
340 345 350

Val Val Ala Thr Glu Val Ala Lys Ala Met Leu Glu Lys Phe Asp Ser
355 360 365

Asp Ser Phe Glu Gln Met Lys Glu Ala Val Lys Arg Tyr Arg Leu Tyr
370 375 380

Thr Gln Asn Phe
385

<210> 44
<211> 364
<212> PRT
<213> Enterococcus faecalis

<400> 44

Met Lys Lys Arg Ile Leu Ile Val Gly Leu Gly Leu Ile Gly Ser Ser
1 5 10 15

Leu Ala Leu Cys Ile Lys Lys Gly His Pro Asn Ser Glu Ile Ile Gly
20 25 30

Phe Asp Asn Gln Ala Glu Ala Thr Glu Phe Ala Lys Lys Thr Gly Leu
35 40 45

Ile Asp Glu Ile Ala Glu Ser Leu Thr Ser Gly Ala Arg Arg Ala Glu
50 55 60

Ile Ile Phe Leu Cys Ser Pro Val Lys Ala Thr Leu Val Gln Leu Glu
65 70 75 80

Glu Leu Asn Gln Leu Ser Leu Glu Thr Ala Leu Ile Thr Asp Val Gly
85 90 95

Ser Thr Lys Val Glu Ile Asn Gln Leu Ala Thr Lys Leu Asn Met Lys
100 105 110

Asn Phe Ile Gly Gly His Pro Met Ala Gly Ser His Lys Ser Gly Val
115 120 125

Thr Ala Ala Asp Glu Arg Leu Phe Glu Asn Ala Tyr Tyr Ile Phe Thr
130 135 140

Asp Asp His Gly Glu Lys Asn Lys Gln Ile Gln Glu Leu Gln Thr Leu
145 150 155 160

Leu Lys Gly Thr His Ala Lys Phe Ile Thr Met Pro Ala Gln Glu His
165 170 175

Asp Glu Ile Thr Gly Ala Leu Ser His Leu Pro His Ile Val Ala Ala
180 185 190

Ala Leu Val Asn Glu Ser Gln Gln Leu Asn Thr Thr Tyr Pro Arg Ala
195 200 205

Gln Gln Leu Ala Ala Gly Gly Phe Arg Asp Ile Thr Arg Ile Ala Ser
210 215 220

Ser Asp Ala Thr Met Trp Thr Asp Ile Leu Leu Ser Asn Arg Leu Val
225 230 235 240

Leu Leu Asp Leu Leu Glu Asn Trp Gln Lys Glu Met Thr Thr Val Cys
245 250 255

Gln Trp Leu Thr Glu Lys Asn Ala Pro Ala Ile Arg Asn Phe Phe Asp
260 265 270

Lys Ala Lys Glu Thr Arg Ala Gln Leu Pro Ile His Lys Glu Gly Ala
275 280 285

Ile Pro Ala Phe Tyr Asp Leu Phe Val Asp Val Pro Asp Gln Pro Gly
290 295 300

Ile Ile Ala Glu Ile Thr Gln Ile Leu Gly Glu Ala Asp Leu Ser Leu
305 310 315 320

Thr Asn Ile Lys Ile Leu Glu Thr Arg Glu Glu Ile Tyr Gly Ile Leu
325 330 335

Gln Leu Ser Phe Lys Asn Gln Pro Asp Cys Gln Ala Ala Lys Gln Ile
340 345 350

Leu Ser Lys Lys Thr Asn Tyr Thr Cys Tyr Glu Lys
 355 360

<210> 45
 <211> 428
 <212> PRT
 <213> Enterococcus faecalis

<400> 45

Met Arg Val Gln Leu Arg Thr Asn Val Lys His Leu Gln Gly Thr Leu
 1 5 10 15

Met Val Pro Ser Asp Lys Ser Ile Ser His Arg Ser Ile Met Phe Gly
 20 25 30

Ala Ile Ser Ser Gly Lys Thr Thr Ile Thr Asn Phe Leu Arg Gly Glu
 35 40 45

Asp Cys Leu Ser Thr Leu Ala Ala Phe Arg Ser Leu Gly Val Asn Ile
 50 55 60

Glu Asp Asp Gly Thr Thr Ile Thr Val Glu Gly Arg Gly Phe Ala Gly
 65 70 75 80

Leu Lys Lys Ala Lys Asn Thr Ile Asp Val Gly Asn Ser Gly Thr Thr
 85 90 95

Ile Arg Leu Met Leu Gly Ile Leu Ala Gly Cys Pro Phe Glu Thr Arg
 100 105 110

Leu Ala Gly Asp Ala Ser Ile Ala Lys Arg Pro Met Asn Arg Val Met
 115 120 125

Leu Pro Leu Asn Gln Met Gly Ala Glu Cys Gln Gly Val Gln Gln Thr
 130 135 140

Glu Phe Pro Pro Ile Ser Ile Arg Gly Thr Gln Asn Leu Gln Pro Ile
 145 150 155 160

Asp Tyr Thr Met Pro Val Ala Ser Ala Gln Val Lys Ser Ala Ile Leu
 165 170 175

Phe Ala Ala Leu Gln Ala Glu Gly Thr Ser Val Val Val Glu Lys Glu

180		185		190
Lys Thr Arg Asp His Thr Glu Glu Met Ile Arg Gln Phe Gly Gly Thr	195	200		205
Leu Glu Val Asp Gly Lys Lys Ile Met Leu Thr Gly Pro Gln Gln Leu	210	215		220
Thr Gly Gln Asn Val Val Val Pro Gly Asp Ile Ser Ser Ala Ala Phe	225	230		235
Phe Leu Val Ala Gly Leu Val Val Pro Asp Ser Glu Ile Leu Leu Lys	245	250		255
Asn Val Gly Leu Asn Gln Thr Arg Thr Gly Ile Leu Asp Val Ile Lys	260	265		270
Asn Met Gly Gly Ser Val Thr Ile Leu Asn Glu Asp Glu Ala Asn His	275	280		285
Ser Gly Asp Leu Leu Val Lys Thr Ser Gln Leu Thr Ala Thr Glu Ile	290	295		300
Gly Gly Ala Ile Ile Pro Arg Leu Ile Asp Glu Leu Pro Ile Ile Ala	305	310		315
Leu Leu Ala Thr Gln Ala Thr Gly Thr Thr Ile Ile Arg Asp Ala Glu	325	330		335
Glu Leu Lys Val Lys Glu Thr Asn Arg Ile Asp Ala Val Ala Lys Glu	340	345		350
Leu Thr Ile Leu Gly Ala Asp Ile Thr Pro Thr Asp Asp Gly Leu Ile	355	360		365
Ile His Gly Pro Thr Ser Leu His Gly Gly Arg Val Thr Ser Tyr Gly	370	375		380
Asp His Arg Ile Gly Met Met Leu Gln Ile Ala Ala Leu Leu Val Lys	385	390		395
Glu Gly Thr Val Glu Leu Asp Lys Ala Glu Ala Val Ser Val Ser Tyr	405	410		415

Pro Ala Phe Phe Asp Asp Leu Glu Arg Leu Ser Cys
 420 425

<210> 46
 <211> 168
 <212> PRT
 <213> Enterococcus faecalis
 <400> 46

Met Glu Ser Ile Val Leu Ile Gly Phe Met Gly Ala Gly Lys Thr Thr
 1 5 10 15

Ile Gly Gln Ser Leu Ala Asn Lys Leu Lys Met Pro His Leu Asp Leu
 20 25 30

Asp Thr Ala Leu Ile Glu Lys Ile Gly Arg Ser Ile Pro Asp Tyr Phe
 35 40 45

Glu Lys Tyr Gly Glu Ala Ala Phe Arg Glu Gln Glu Thr Gln Leu Leu
 50 55 60

Lys Glu Leu Ser Lys Asn Thr Ala Val Leu Ser Thr Gly Gly Gly Ile
 65 70 75 80

Val Val Gly Pro Glu Asn Arg Ser Leu Leu Lys Ser Phe Gln Gln Val
 85 90 95

Ile Tyr Leu His Ala Thr Pro Glu Glu Leu Leu Lys Arg Ile Thr Glu
 100 105 110

Asp Thr Glu Asn Gln Arg Pro Leu Ala Ile Glu Arg Ser Ser Lys Glu
 115 120 125

Ile Ile Thr Leu Phe Glu Ser Arg Lys Asn Phe Tyr Glu Glu Cys Ala
 130 135 140

Lys Met Thr Ile Asp Thr Thr Asn Arg Ser Pro Glu Glu Ile Ile Asn
 145 150 155 160

Glu Ile Leu Gln Gln Leu Lys Glu
 165

<210> 47
 <211> 282
 <212> PRT
 <213> Enterococcus faecalis

<400> 47

Met Lys Val Gly Tyr Leu Gly Pro Ile Gly Ser Phe Thr Tyr Ser Ala
 1 5 10 15

Thr Leu Ala Ala Phe Pro Glu Ala Thr Leu Met Pro Tyr Ala Ser Ile
 20 25 30

Pro Ala Cys Leu Lys Ala Ile Glu Gln Gln Glu Val Ala Trp Ser Ile
 35 40 45

Ile Pro Ile Glu Asn Thr Ile Glu Gly Thr Val Asn Ala Ser Ile Asp
 50 55 60

Tyr Leu Tyr His Gln Ala Gln Leu Pro Val Gln Ala Glu Leu Val Leu
 65 70 75 80

Pro Ile Gln Gln Gln Leu Met Val Ala Lys Glu Asn Gln Ala Ile Trp
 85 90 95

Gln Gln Ser Gln Lys Ile Leu Ser His Pro Gln Ala Leu Ala Gln Ser
 100 105 110

Gln Met Phe Leu Glu Lys Asn Phe Pro Glu Ala Ile Leu Glu Ala Thr
 115 120 125

Pro Ser Thr Ala Tyr Ala Ala Lys Tyr Ile Ala Glu His Pro Glu Leu
 130 135 140

Pro Phe Ala Ala Ile Ala Pro Lys Leu Ser Ala Glu Met Tyr Asp Leu
 145 150 155 160

Thr Ile Val Glu Lys Asn Ile Gln Asp Leu Ser Val Asn Gln Thr Arg
 165 170 175

Phe Trp Val Leu Gly Ser Glu Asn Leu Ala Ile Ser Phe Pro Leu Ser
 180 185 190

Glu Lys Lys Ile Thr Leu Ala Ile Thr Met Pro Ser Asn Val Pro Gly
 195 200 205

Ser Leu His Lys Val Leu Ser Val Phe Ser Trp Arg Gly Ile Asn Leu
210 215 220

Ser Lys Ile Glu Ser Arg Pro Leu Lys Thr Lys Leu Gly Glu Tyr Phe
225 230 235 240

Phe Leu Met Asp Leu Val Lys Asp Gln Pro Glu Lys Leu Ile Glu Ala
245 250 255

Ala Leu Thr Glu Leu Glu Leu Ile Gly Ala Glu Ile Lys Ile Leu Gly
260 265 270

Asp Tyr Pro Ile Tyr Val Leu Ser Thr Leu
275 280